ASOS MODIFICATION NOTE 64 (for Electronics Technicians)
Engineering Division
W/OSO321: WDW

| | | |
|---|---|---|
| SUBJECT | : | Installation of a Universal Power Supply (UPS) in a Class I Acquisition Control Unit (ACU) (P/N 62828-40044-20) |
| PURPOSE | : | To provide a back-up AC power source. |
| EQUIPMENT AFFECTED | : | The UPS will be tied electrically between the incoming facility AC power and the Power Distribution Assembly (PDA) to the ACU. |
| PARTS REQUIRED | : | Field Modification Kit (FMK): S100-FMK088 (reference appendix B). |
| MOD PROCUREMENT | : | Washington Central Support will issue one UPS to the Class I ACUs listed in appendix A. |
| TOOLS REQUIRED | : | Maintenance Note 46 - UPS Configuration Table<br>Wire stripper<br>Small slotted screwdriver<br>Medium Phillips screwdriver<br>Voltmeter<br>36-feet of 14-gauge stranded wire, 600v, white |
| RECOMMENDED TOOLS | : | AMP pin extractor tool (P/N 843473-1)<br>AMP pin insertion tool (P/N 91002-1) |
| TIME REQUIRED | : | 4 Hours |
| SPECIAL INSTRUCTIONS | : | Modification Note 51, ACU Solid-State Time Delay Relay (SSTDR), must be installed prior to this modification. |
| EFFECTIVITY | : | Sites listed in appendix A. |
| CERTIFICATION STATEMENT | : | This modification is authorized by the following ECPs: **S00878, S00947, S00893, S01100, S01099, S01083, S00960, S00760, S00721**. This modification has been tested at MTO, LWV, and UNO. |



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## GENERAL

This modification contains procedures to install the Deltec PowerRite Pro II UPS (model # 05144188 A) and UPS bypass circuitry into a Class I ACU (P/N 62828-40044-20). The UPS provides back-up AC power to the ACU in the event of intermittent or total facility power loss. Back-up power is provided to the UPS by a 48-volt direct current battery pack which the UPS monitors and maintains an optimal charge under normal operating conditions.

## PROCEDURE

The following instructions outline procedures for installation of the UPS.

NOTE:
Ensure the SSTDR (K1) has been installed inside the ACU prior to performing this modification. If not, Modification Note 51 must be performed.

### BEFORE INSTALLATION OF THE UPS

1. Call the Automated Surface Observing System (ASOS) Operations and Monitoring Center (AOMC) at 1-800-242-8194, and provide notification on which ASOS you will be installing the UPS.

2. Get approval of the responsible meteorologist-in-charge (MIC)/official-in-charge (OIC)/observer before starting installation. Installation of the UPS may be performed on any day of the month if restrictions in steps 3 and 4 are satisfied.

3. **Commissioned Sites Only:** Do not start installation during inclement weather, precipitation, instrument flight rule conditions, or if any of those conditions are expected within 3 hours. The responsible MIC/OIC/observer will define these meteorological conditions.

4. Do not start UPS installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Allow 4 hours to complete the installation and restart ASOS.

5. Immediately before beginning work at the National Weather Service (NWS)-staffed sites, the MIC/OIC/observer will inform the air traffic control tower (ATCT) and other critical users the ASOS will be turned off for the data collection platform upgrade. At an unstaffed site, the electronics technicians will inform the ATCT using controller video displays and operator interface devices that sensor data will be missing during this modification.

6. Do not begin installation until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal back-up observing procedures will be implemented.

7. At the operator interface device (OID), log on as TECH.

   a. Key **MAINT** - **ACT** - **FMK** and enter MOD **64**.
   b. Key **MAINT** - **ACT** - **FMK** - **START**.

## INSTALLATION OF THE UPS IN A CLASS I ACU

**WARNING**

**Ensure the AC power is completely removed from the ACU. DEATH OR SEVERE INJURY may result if power is not completely removed from the ACU**.

**CAUTION**

**Power reset kit (62828-40440-10) must be installed in the ACU before the UPS bypass kit (62828-40441) can be installed. Firmware Revision 2.60 or higher must be present in the ACU memory card for ASOS to monitor this change.**

NOTE

One RS232 serial input/output (SIO) port is necessary to install the UPS. SIO #1 cannot be used for the UPS. SIO ports adjacent to a CODEX modem or a ground-to-air radio cannot be used. If an additional SIO board must be installed, reference Modification Note 42, page A-1, steps 4-7.

1. At the OID, press **REVUE** - **SITE** - **CONFG** - **COMMS**. Review the RS232 port assignments and choose any unused RS232 port, *except SIO #1*.

2. Remove facility power to the ACU by disconnecting the power plug from J41 on the I/O panel at the rear of the ACU.

**CAUTION**

**Blower wiring is still connected to the PDA.**

3. At the bottom of the ACU, remove the blower cover (B1) and slide it out of the cabinet as far as possible.

4. Remove the following two wires from the PDA (1A7):

   a. Gray wire labeled A7-18C/A7-23A.
   b. White wire labeled A7-19C/A7-22A.

5. In the bottom on the ACU cabinet, install the angle mounting brackets (P/N 62828-40180-1 and -3) to the vertical unistruts with the appropriate hardware (62828-90288-1, MS51957-82, MS35338-139, MS15795-810). Refer to figure 1.

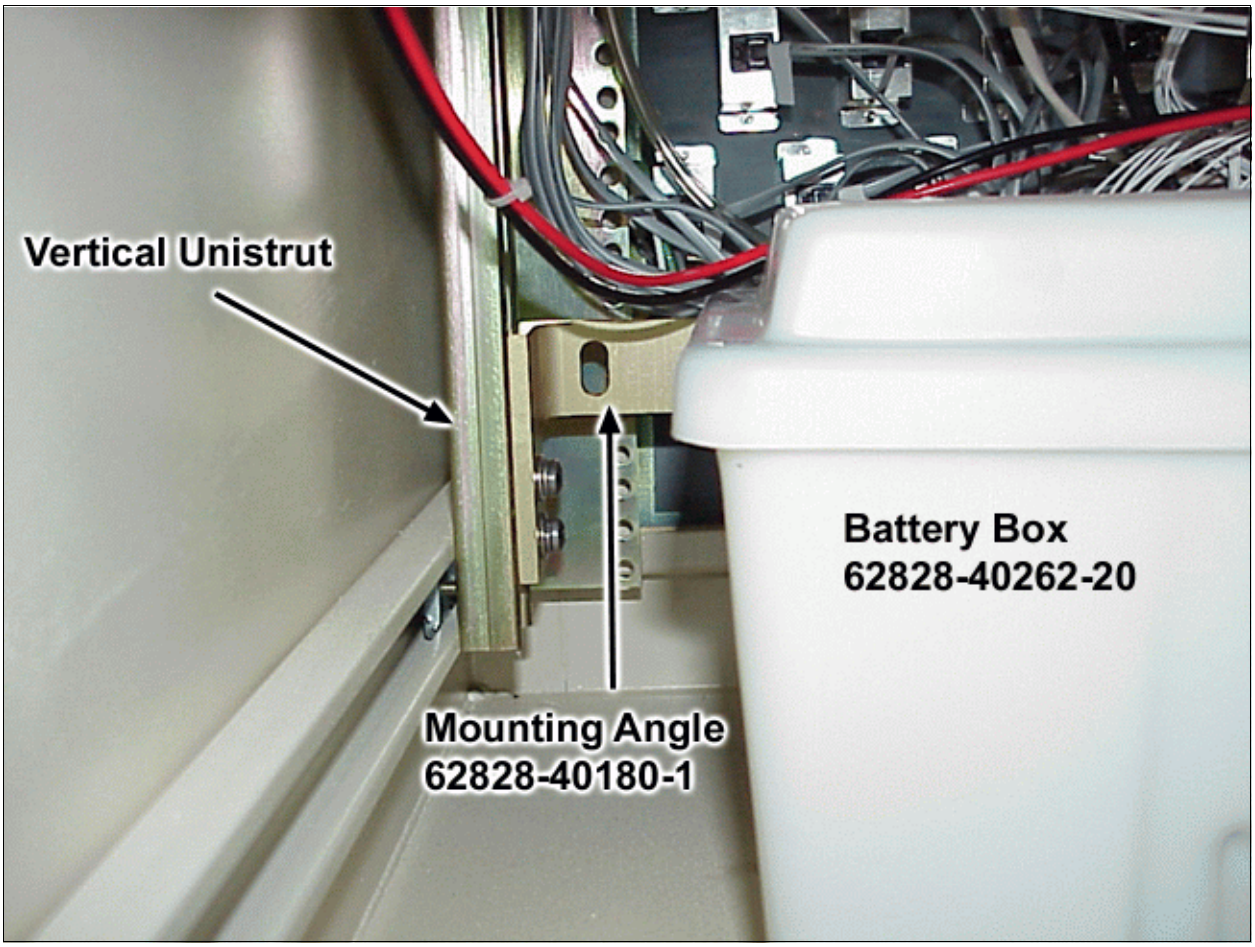


**Figure 1 Mounting Angle Installation**

6. Place the battery box (62828-40262-20) on the bottom of the ACU cabinet behind the blower. Refer to figure 1.

7. Hook the rubber strap (62828-90250-1) to the installed mounting angles and around the battery box.

8. Reinstall the blower (B1).

9. In the FMK, locate each chassis slide (62828-90220-3) and remove the small innermost slides.

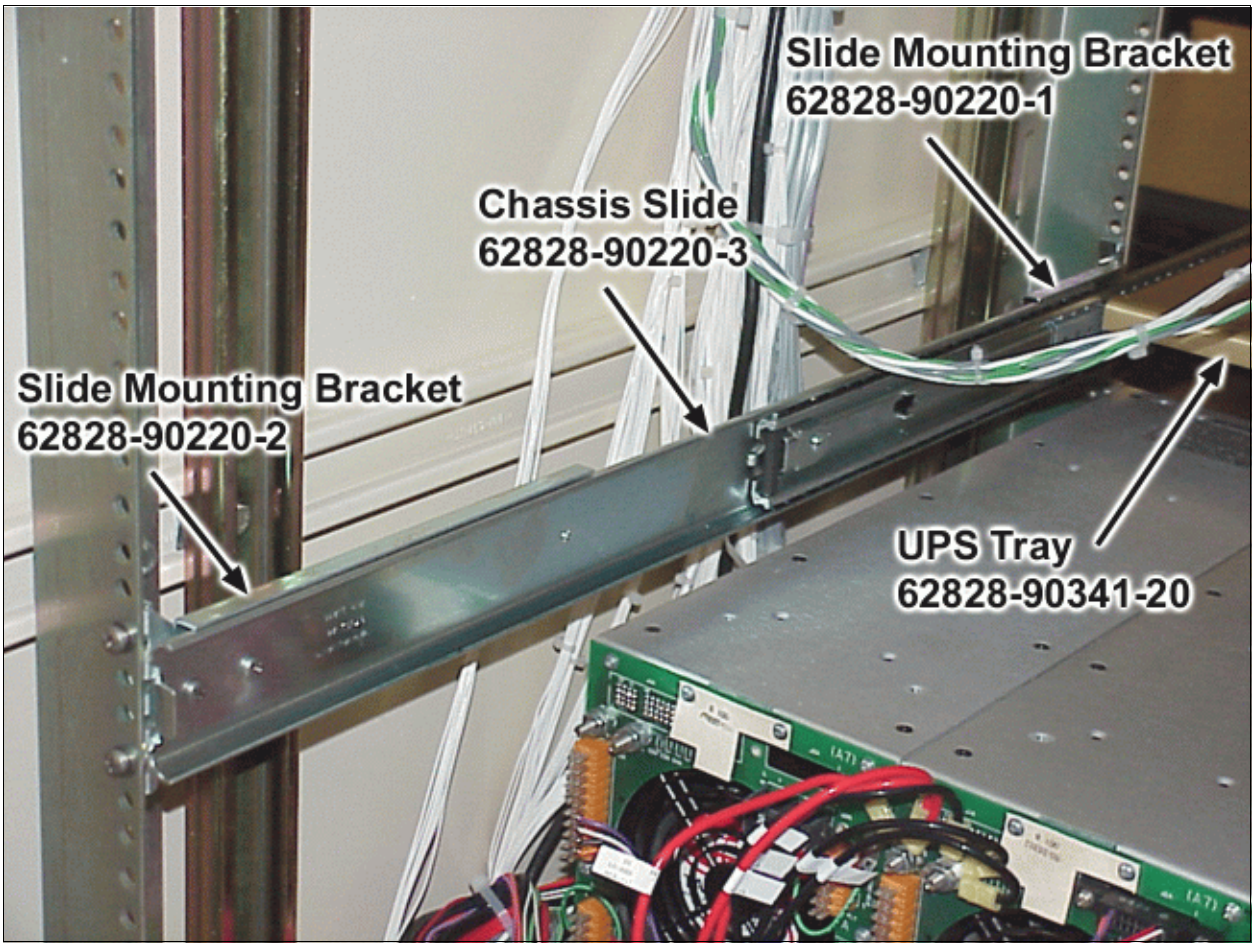


**Figure 2 Chassis Slide and Mounting Brackets**

10. In the ACU cabinet, attach the slide mounting brackets (62828-90220-1 and -2) to the chassis slide using the appropriate hardware (MS51957-44, MS35338L-137, and MS15795-807). The slides should be positioned immediately above the DC power supply in position A4. Ensure the front of the chassis slide is flushed with the small slide mounting bracket. Refer to figure 2.

11. Attach the small inner slides, removed in step 9, to the UPS tray (62828-40135-20).

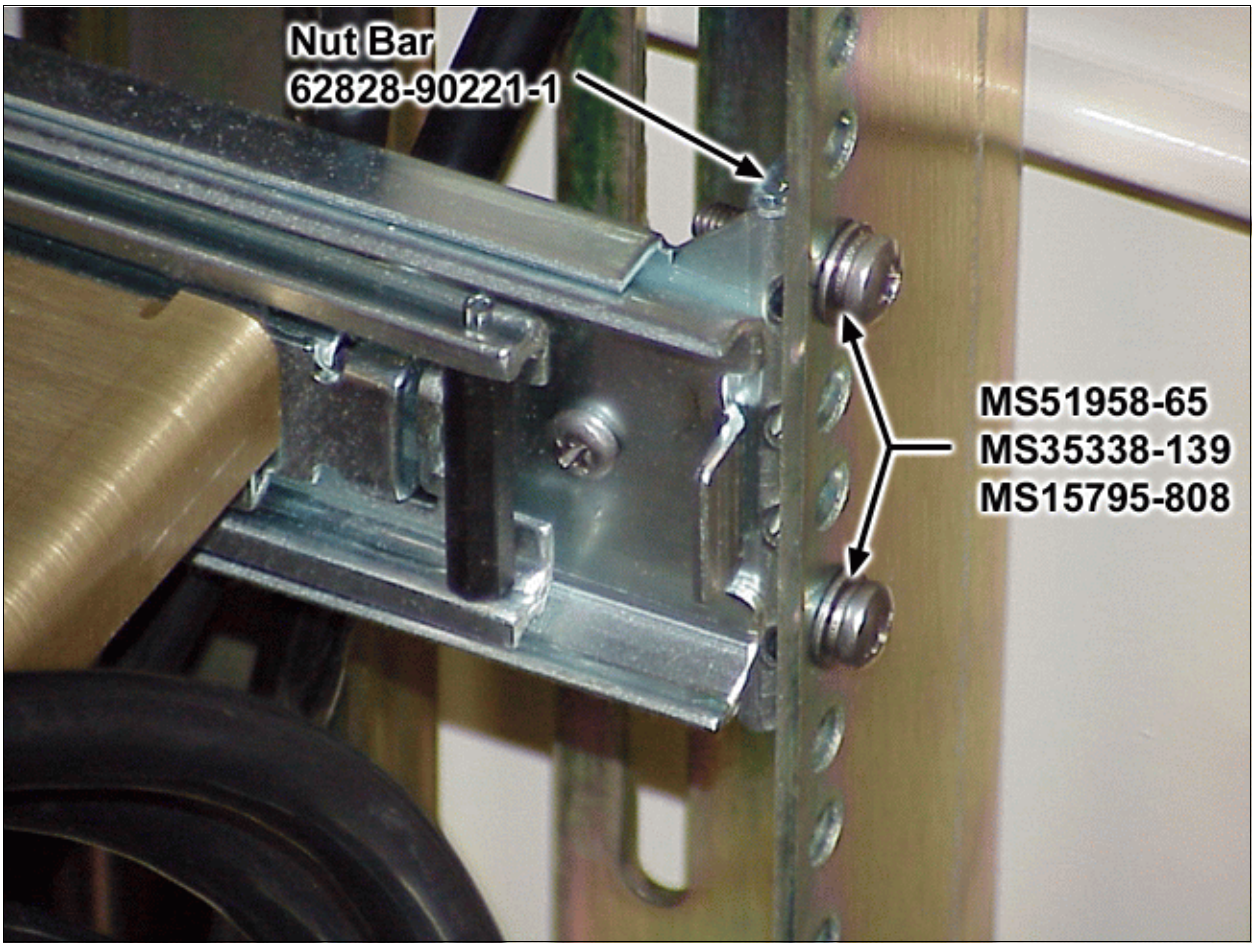


**Figure 3 Chassis Slide Assembly Mounted in the ACU**

12. Install the chassis slide assemblies into the ACU cabinet using nut bars (62828-90221-1) and appropriate hardware (MS51958-65, MS35338-138, and MS15795-808). Refer to figure 3.

13. Install the UPS tray onto the slide assemblies. Slide the tray in and out of the ACU adjusting the slides so they do not bind the tray. Tighten any remaining hardware.

14. Place the UPS (62828-90338-10) onto the UPS tray, and secure it with two straps (62828-90341-1 and -2).

15. Locate the spare SIO cable that corresponds to the free SIO port located in step 1. If a new SIO card was added, find the cable labeled Port 1 of that board. Route this cable to the UPS tray.

16. Install the RS232 cable W78 (62828-42029-10) between the SIO cable, from step 15, and the UPS comm-port located on the back of the unit.

17. Locate W89 AC power cable (62828-42047-20) in the FMK. The wires in this bundle are only 2-feet long, too short for this modification. Disassemble the two plugs on this wire bundle and replace each wire with a 14-gauge stranded wire approximately 6-feet long. Relabel each wire as illustrated in figure 4.

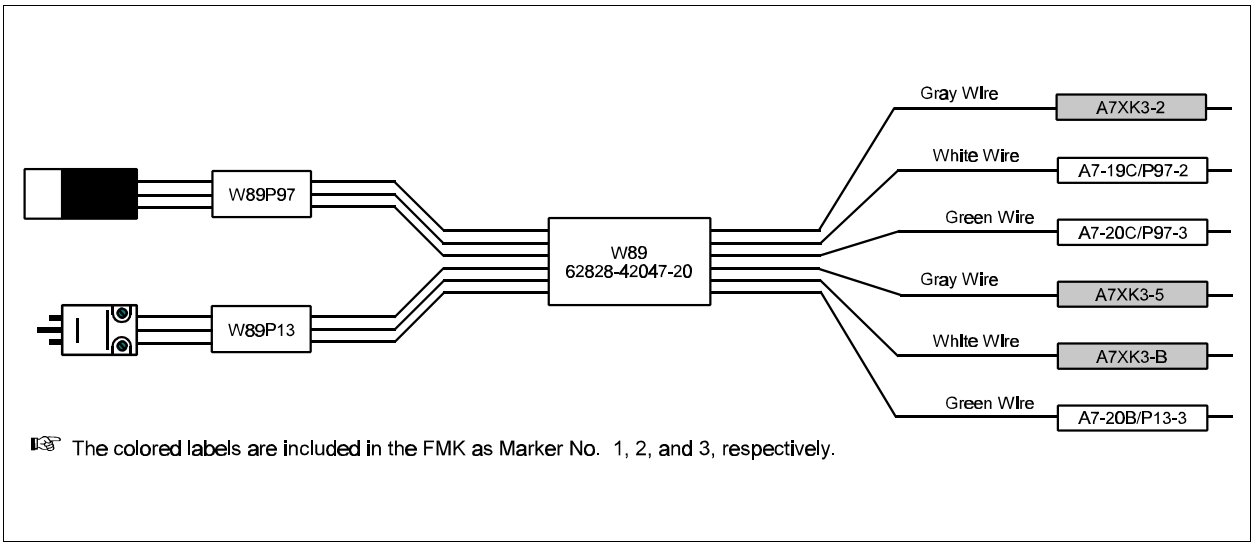


**Figure 4 AC Power Cable Relabeling**

18. Install the relabled AC power cable W89 as follows:

    a. W89P13 (yellow plug) plugs into a UPS output receptacle.
    b. W89P97 mates with the UPS line cord.

19. Route the W89 cables around to the PDA at 1A7 and connect the following wires:

NOTE
Three wires will be tied into the UPS bypass circuitry in a later step.

    a. Green wire labeled A7-20B/P13-3 to 1A7-20B.
    b. White wire labeled A7-19C/P97-2 to 1A7-19C.
    c. Green wire labeled A7-20C/P97-3 to 1A7-20C.

20. Run the cable attached to the top of the battery box, and plug into the battery connector on the back of the UPS.

21. At the back of the ACU, locate the PDA, and detach the right side of the din rail from the cabinet.

22. Locate K2 (62828-90429-1) and XK3 (62828-90430-1) in the FMK, and slide them onto the din rail to the right of the PDA. Refer to figure 5.

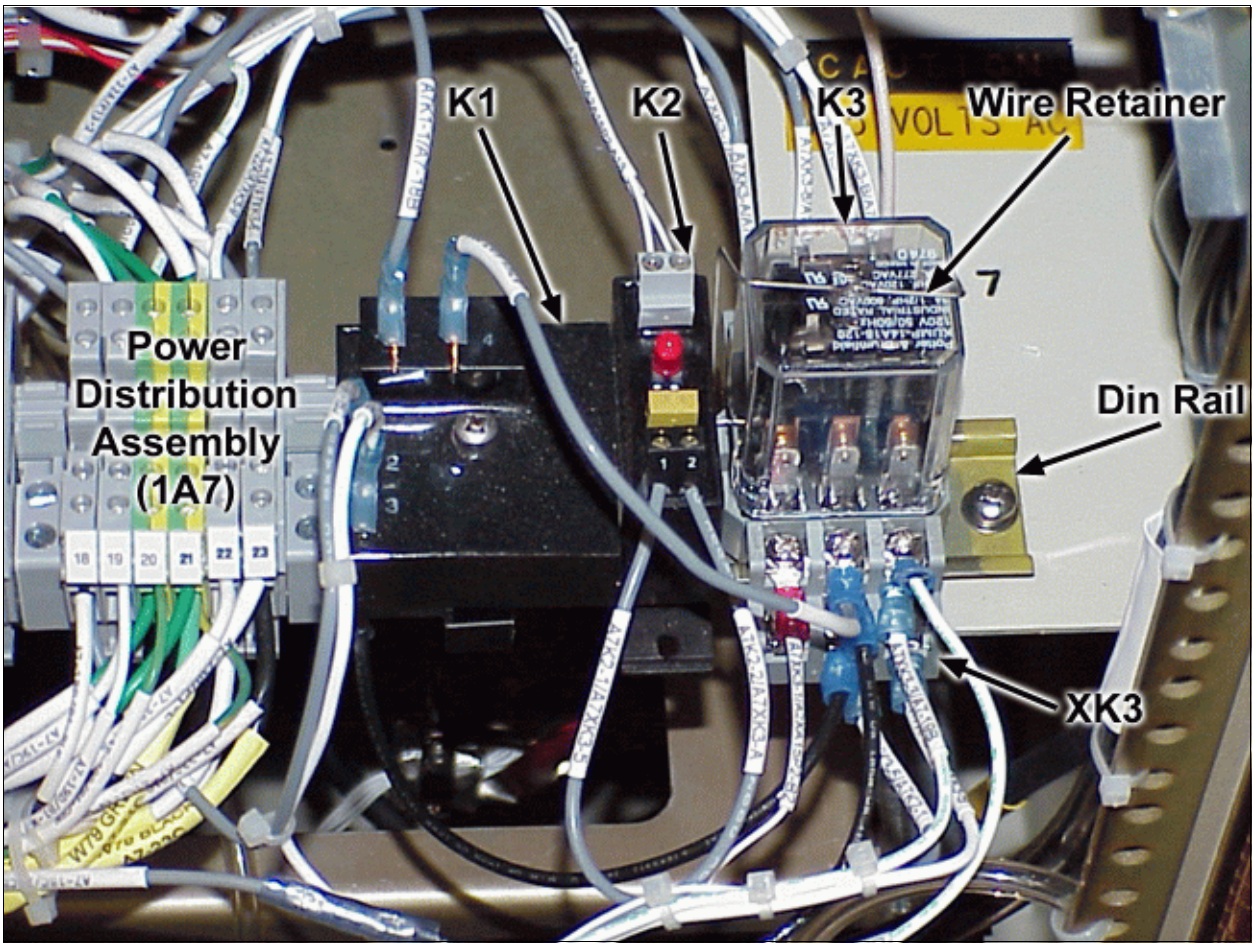


**Figure 5 UPS Bypass Assembly (1A7)**

23. Locate the ACU UPS bypass wire harness (W137) in the FMK, and make the following connections to the PDA. Some PDA positions may already have wires in these positions.

NOTE

When making connections to the PDA, ensure the wires are not inserted too far into their terminals. If this occurs and the terminal screw is tightened down, the wire insulation may prevent proper contact from taking place. Likewise, check each connection made to the PDA by giving a slight tug on each wire.

| FROM WIRE BUNDLE | WIRE LABEL | CONNECT TO |
|---|---|---|
| W137 | A7-19B/A7XK3-3 | 1A7-19B |
| | A7-22A/A7XK3-9 | 1A7-22A |
| | A7-23A/A7XK3-8 | 1A7-23A |

24. Disconnect wire labeled A7-23A/A7K1-4 from A7-23A. Remove this label and replace with marker No. 1 (62828-40441-1) from the FMK.

| FROM WIRE BUNDLE | WIRE LABEL | CONNECT TO |
|---|---|---|
| W137 | A7K2-1/A7XK3-5 | K2-1 |
| | A7K2-2/A7XK3-A | K2-2 |
| W137 and W89 | A7XK3-5/A7K2-1<br>A7XK3-5 | XK3-5 |
| W137 | A7XK3-6/A7XK3-B | XK3-6 |
| | A7XK3-1/A2XA15P2-B2 | XK3-1 |
| Step 24 and W89 | A7XK3-2<br>A7XK3-2 | XK3-2 |
| W137 | A7XK3-3/A7-19B | XK3-3 |
| | A7K2-4/A2A15P2-A13 | K2-4 |
| | A7K2-3/A2XA15P2-B1 | K2-3 |
| | A7XK3-7/A2XA15P2-A7 | XK3-7 |
| | A7XK3-8/A7-23A | XK3-8 |
| | A7XK3-9/A7-22A | XK3-9 |
| | A7XK3-A/A7K2-2 | XK3-A |
| W137 and W89 | A7XK3-B/A7XK3-5<br>A7XK3-B | XK3-B |

25. Reattach the din rail.

26. Remove the digital I/O board (1A2XA15) from the VMEbus.

27. At the rear of the ACU cabinet, locate the lower portion (P2) of the digital I/O board (1A2XA15). Insert the four thin, white wires into their respective slots in the P2 connector terminal. Refer to figure 6.

NOTE

When inserting the wires into the digital I/O (1A2XA15) connector terminal (P2), be sure to listen for a “click” sound. This will indicate the pin is seated properly.

NOTE

Insert each pin with the retaining clip in a *down* position. Inserting these pins in sideways will result in damage to their clips.

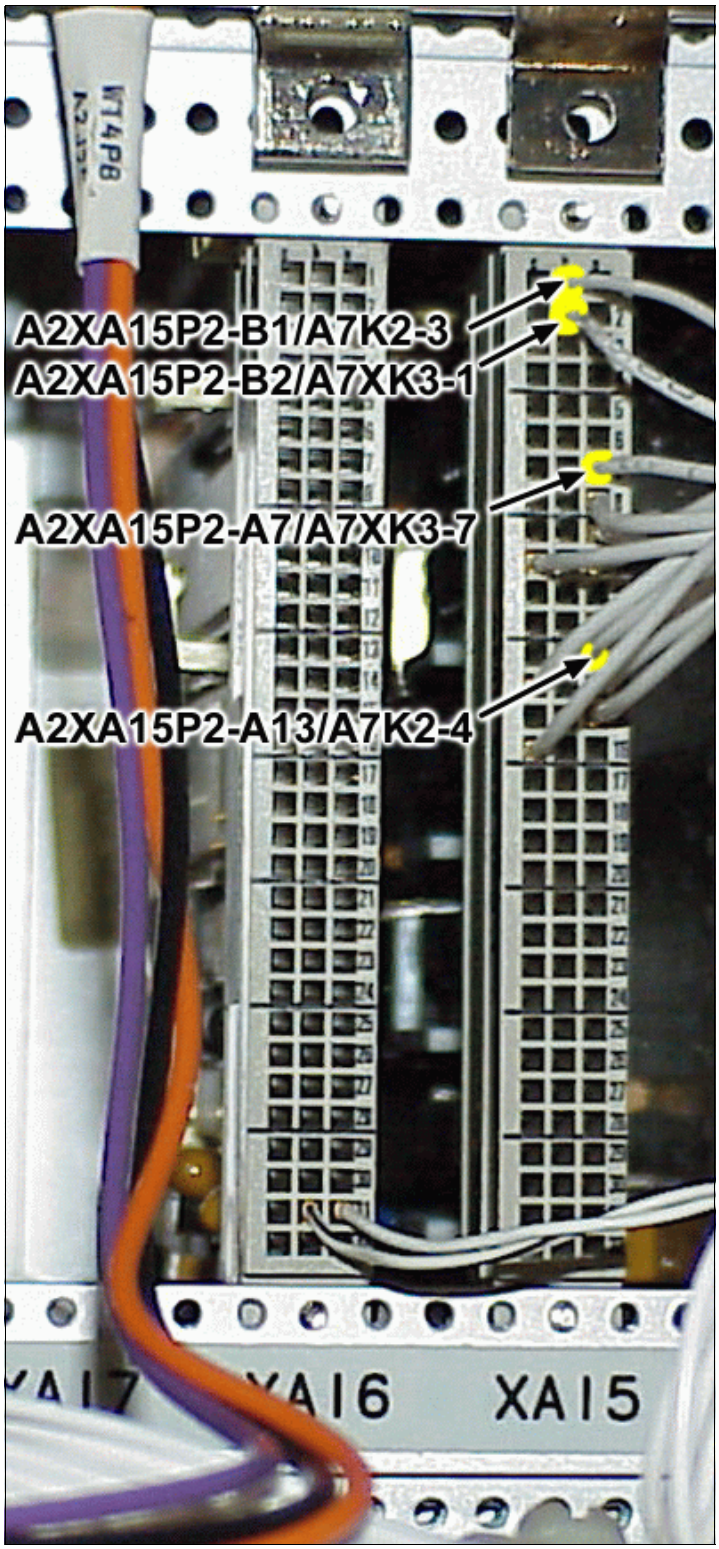


**Figure 6 1A2XA15-P2**

28. Spot tie any loose wires.

29. Slide the UPS tray into the ACU cabinet and secure with a screw (MS51958-65), lockwasher (MS35338-138), and flatwasher (MS15795-808).

30. Reapply power to the ACU and switch the UPS power switch, located on the front of the unit, to on (1).

NOTE

When facility power is reapplied to the ACU, there will be approximately a 3-second delay until the ACU begins to run. When power is applied to the UPS, the UPS will perform its start-up procedure.

31. Refer to Maintenance Note 46, UPS Configuration Table, and configure the UPS according to the setup of the system.

32. Once the UPS has been configured according to Maintenance Note 46, proceed with **SYSTEM CHECKOUT**.

## SYSTEM CHECKOUT

1. Before returning to the OID, perform the following:

   a. Verify the red LED on A7K2 is illuminated.
   b. Using a voltmeter, verify that 115 VAC ± 10% is present across pins A7XK3-A and A7XK3-B.

2. At the OID, log on as a technician.

3. Key **MAINT** - **ACU** - **ACU UPS**.

   Verify the UPS bypass status and command fields read:
   - UPS INLINE P
   - CMD UPS INLINE ON

4. Key **BYPAS**.

   After approximately 2 minutes, verify the UPS bypass status, command, and fail count fields read:
   - UPS INLINE F 1
   - CMD UPS INLINE OFF

5. Verify the LED on A7K2 is *NOT* illuminated. Using a voltmeter, verify *less than* 10 VAC are present across pins A7XK3-A and A7XK3-B.

6. Key **BYPAS**.

   After approximately 2 minutes, verify the UPS bypass status, command, and fail count fields read:

   - UPS INLINE P 1
   - CMD UPS INLINE ON

7. Completely remove facility power to the ACU cabinet. The ACU should go into battery mode, and the system clock should continue to update without a glitch. After approximately 2 minutes, verify the following field changes:

   - INPUT VOLTAGE ***
   - ON AC LINE F 1

8. Reapply facility power to the ACU cabinet. After approximately 2 minutes, verify the following field changes:

   - INPUT VOLTAGE 112
   - ON AC LINE P 1

9. Check the 12-HR pages to ensure data is being collected from the sensors. Clear all failures on the MAINT pages for the ACU by powering down the system.

10. When complete, press the **EXIT** key.

11. Affix the reidentification label (FMK88-1) on the inside of the ACU front door.

12. Proceed with **AFTER UPS INSTALLATION**.

## AFTER UPS INSTALLATION

1. Contact the AOMC at 1-800-242-8194 and inform the operator of:

   a. Your location.
   b. The installation of the UPS kit and UPS bypass relay have been completed.

2. Enter in the SYSLOG that maintenance has been completed. Key the following functions: **MAINT** - **ACT** - **FMK**.

   For the FMK number, enter: **MOD 64**. On the second line of the screen, verify only MOD 65 is displayed. Complete by entering **Y** in the [Y/N] area if only MOD 65 is displayed.

3. Check the SYSLOG, and verify the FMK message. Enter a comment in the SYSLOG

stating the UPS has been installed.

## REPORTING MODIFICATION

Target date for completion of this modification is 45 days after receipt of parts. Report the completed modification on an NWS Form A-26, Maintenance Record, using the instructions in Engineering Handbook No. 4 (EHB-4), Engineering Management Reporting System (EMRS), part 2, appendix A. Report the modification to the ACU using the equipment code **AACU** in block 7. Record a modification number of **64** in block 17a of the A-26.

A sample WS Form A-26, Maintenance Record, has been included in appendix **C**.

***Original Signed***

John McNulty
Chief, Engineering Division

Appendix A - Effectivity List
Appendix B - Parts List
Appendix C - A-26 Form (Sample)

| Class I ASOS Sites to Install a UPS into the ACU | | | |
|---|---|---|---|
| **Site ID** | **City, State** | **Region** | **Completed** |
| ADG | Adrian, MI | Central | |
| BDE | Baudette, MN | Central | |
| BPI | Big Piney, WY | Central | |
| GVW | Kansas City, MO | Central | |
| HYR | Hayward, WI | Central | |
| IEN | Pine Ridge, SD | Central | |
| IOW | Iowa City, IA | Central | |
| ITR | Burlington, CO | Central | |
| LAA | Lamar, CO | Central | |
| LWC | Lawrence, KS | Central | |
| LWV | Larwenceville, IL | Central | Completed |
| MIW | Marshalltown, IA | Central | |
| MTJ | Montrose, CO | Central | |
| MTO | Mattoon, IL | Central | Completed |
| PKD | Park Rapids, MN | Central | |
| PPF | Parsons, KS | Central | |
| RAC | Racine, WI | Central | |
| RHI | Rhinelander, WI | Central | |
| TQE | Tekamah, NE | Central | |
| UNO | West Plains, MO | Central | Completed |
| AFN | Jaffrey, NH | Eastern | |
| AKR | Akron, OH | Eastern | |
| AQW | North Adams, MA | Eastern | |
| BJJ | Wooster, OH | Eastern | |
| BML | Berlin, NH | Eastern | |

| | | | |
|---|---|---|---|
| FIG | Clearfield, PA | Eastern | |
| FIT | Fitchburg, MA | Eastern | |
| FVE | Frenchville, ME | Eastern | |
| HIE | Whitefield, NH | Eastern | |
| IWI | Wiscassest, ME | Eastern | |
| IZG | Fryeburg, ME | Eastern | |
| MLT | Millinocket, ME | Eastern | |
| MVL | Morrisville, VT | Eastern | |
| ORE | Orange, MA | Eastern | |
| PHD | New Phildephia, OH | Eastern | |
| UUU | Newport, RI | Eastern | |
| VSF | Springfiled, VT | Eastern | |
| WST | Westerly, VT | Eastern | |
| AQQ | Apalachicola, FL | Southern | |
| BKV | Brooksville, FL | Southern | |
| BPK | Mountain Home, AR | Southern | |
| CAO | Clayton, NM | Southern | |
| CRS | Corsicana, TX | Southern | |
| CXO | Conroe, TX | Southern | |
| DCU | Decatur, AL | Southern | |
| DNL | Augusta, GA | Southern | |
| DTO | Denton, TX | Southern | |
| GIF | Winter Haven, FL | Southern | |
| GVL | Gainesville, GA | Southern | |
| HKA | Blytheville, AR | Southern | |
| LBX | Angelton, TX | Southern | |
| LEE | Leesburg, FL | Southern | |
| LVJ | Houston, TX | Southern | |
| MTH | Marathon, FL | Southern | |

| | | | |
|---|---|---|---|
| PGD | Punta Gorda, FL | Southern | |
| PIL | Port Isabel, TX | Southern | |
| RKP | Rockport, TX | Southern | |
| UTS | Huntsville, TX | Southern | |
| CLM | Port Angeles, WA | Western | |
| FHR | Friday Harbor, WA | Western | |
| RBG | Roseburg, OR | Western | |

| S100-FMK088<br>ACU UPS Installation - Alphabetical Parts Listing | | |
|---|---|---|
| Part Number | Quantity | Nomenclature |
| 62828-40180-1 | 1 | Mounting Angle, 2-1/2" Long |
| 62828-40180-3 | 1 | Mounting Angle, 4" Long |
| 62828-40262-20 | 1 | Battery Box |
| 62828-40441-10 | 1 | UPS Bypass Kit - (Refer to the following table) |
| 62828-42029-10 | 1 | RS232 Cable (W78) |
| 62828-42047-20 | 1 | AC Power Cable (W89) |
| 62828-90220-1 | 2 | Slide Mounting Bracket, 4" Long |
| 62828-90220-2 | 2 | Slide Mounting Bracket, 8-1/2" Long |
| 62828-90220-3 | 2 | Chassis Slide |
| 62828-90221-1 | 4 | Nut Bar |
| 62828-90250-1 | 1 | Rubber Strap |
| 62828-90288-1 | 2 | Unistrut Nut |
| 62828-90338-20 | 1 | Deltec UPS |
| 62828-90341-1 | 1 | Strap, 60" Long |
| 62828-90341-2 | 1 | Strap, 43" Long |
| 62828-90341-20 | 1 | UPS Tray |
| FMK88-1 | 1 | Label, Re-Identification |
| M22473C | 1 | Loctite Sealing Compound |
| MS15795-807 | 9 | 3/16" ID x 3/8" OD Flatwasher |
| MS15795-808 | 10 | 7/32" ID x 7/16" OD Flatwasher |
| MS15795-810 | 4 | 9/32" ID x 5/8" OD Flatwasher |
| MS25281-R4 | 1 | Plastic Clamp |
| MS35338-138 | 10 | No. 10 Lockwasher |
| MS35338-139 | 4 | 1/4" Lockwasher |
| MS35338L-137 | 9 | No. 8 Lockwasher |

| | | |
|---|---|---|
| MS35649-284 | 8 | .1640-32UNC-2B Nut |
| MS51957-44 | 16 | No. 8 Screw, 7/16" Long |
| MS51957-45 | 1 | No. 8 Screw, 1/2" Long |
| MS51957-82 | 4 | 1/4" Screw, 7/8" Long |
| MS51958-64 | 2 | No. 10 Screw, 5/8" Long |
| MS51958-65 | 8 | No.10 Screw, 3/4" Long |
| **62828-40441-10 UPS Bypass Kit<br>Alphabetical Parts Listing** | | |
| 62828-40441-1 | 2 | Marker No. 1 (A7XK3-2) |
| 62828-40441-2 | 1 | Marker No. 2 (A7XK3-5) |
| 62828-40441-3 | 1 | Marker No. 3 (A7XK3-B) |
| 62828-40441-4 | 1 | Marker No. 4 (A7XK3-3) |
| 62828-42108-10 | 1 | ACU UPS Bypass Wire Harness (W137) |
| 62828-90132-1 | 5 | Spade Lug |
| 62828-90428-1 | 1 | High Power Relay (K3) |
| 62828-90429-1 | 1 | Digital I/O Module (K2) |
| 62828-90430-1 | 1 | High Power Relay Socket (XK3) |
| 62828-90438-1 | 1 | Wire Retainer, Relay |
| M7928/5-4 | 3 | Splice, Butt |
| MS3367-4-9 | 12 | Cable Ties |

**EMRS A-26 Form**